ABSTRACT

The present invention provides a chemometric equation to estimate fluid density, viscosity, dielectric constant and resistivity for a formation fluid sample downhole. The chemometric estimates can be used directly as estimated values for fluid density, viscosity, dielectric constant and resistivity for a formation fluid sample downhole. The chemometric estimates can also be plugged into a Levenberg-Marquardt (LM) non-linear least squares fit, as an initial estimate of the parameter to be estimated by the LM fit. If the initial parameter estimate is too far from the actual parameter values, the LM algorithm may take a long time to converge or even fail to converge entirely. The present invention estimates an initial value of a parameter that provides a high probability that the LM algorithm will converge to a global minimum.